APPENDIX A

CALCULATING EMISSIONS FROM ROADSIDE TEST RESULTS

Although the results cannot be compared to the 1994 State Implementation Plan (SIP) targets, we also estimated the emission reductions achieved by Enhanced I/M using our latest emission inventory data, based on the results of roadside testing (as described in Chapter III) and the approved EMFAC2000 model. With this approach, we estimate that the Enhanced I/M program actually achieved emission reductions of 120 tons per day of hydrocarbons (HC) plus nitrogen oxides (NOx) in 1999, as shown in Table A-1. These are the appropriate reduction estimates to use in calculating the cost-effectiveness of the program for Summer 1999.

Table A-1
Emission Reductions from Enhanced I/M in 1999[1,2]
(tons per day)

HC (exhaust + evaporative)	NOx	Carbon monoxide
93	27	785

[1] Cannot be compared to 1994 SIP commitment for attainment and conformity purposes. (See Chapter V for further discussion)
[2] Does not reflect tighter NOx cut points implemented in October 1999.

The emission reductions shown in Table A-1 cannot be used to compare against the legal targets established by California's 1994 SIP for ozone. The 1994 SIP uses older emission models and assumptions that were frozen in time by federal approval of the plan. The emission reductions shown in Table A-1 are higher than the SIP estimates because we now believe overall emissions from vehicles are greater than previously estimated – resulting in more emissions to be reduced by programs like Enhanced I/M.

We calculated the tons of exhaust emissions reduced by the Enhanced program based on the roadside data using the number of vehicles in each model year, their travel frequency, and a correlation equation to convert the roadside test results (in terms of pollutant concentration) to on-road emissions in grams per mile. Table A-2 shows the emission rates and travel fractions used in this calculation. We multiplied the difference between the "Before" and "After" emission rates by the model-year vehicle miles traveled (VMT) and the total number of vehicles in that model-year to calculate the model-year tons per day emissions reductions for each pollutant. We then summed the emission reductions over all model-years to calculate the total tons per day emission reductions.

We also used the roadside data to estimate the evaporative HC emission reductions achieved by the gas cap check. We estimated that Enhanced I/M reduced evaporative HC emission in all Enhanced I/M areas by 20 tons per day in 1999. (This is a change from the April 2000 draft report in which we used ARB's emission model, draft EMFAC2000, to estimate evaporative emission benefits because the roadside gas cap check data was not yet available.)